

WHAT IS CLAIMED:

1. A method for modifying synthesized speech, the method including the steps of:

generating synthesized speech based on textual input and a plurality of run-time control parameter values;

generating real-time data based on an input signal, the input signal characterizing an intelligibility of the speech with regard to a listener; and

modifying one or more of the run-time control parameter values based on the real-time data such that the intelligibility of the speech increases.

2. The method of claim 1 further including the step of generating the real-time data based on background noise contained in an environment in which the speech is reproduced.

3. The method of claim 2 further including the steps of:
converting the background noise into an electrical signal;
retrieving one or more interference models from a model database; and
characterizing the background noise with the real-time data based on the electrical signal and the interference models.

4. The method of claim 3 further including the step of performing a time domain analysis on the electrical signal.

5. The method of claim 3 further including the step of performing a frequency domain analysis on the electrical signal.

6. The method of claim 3 wherein the characterizing step is selected from the group consisting essentially of the steps of:

- identifying high level interference in the background noise;
- identifying low level interference in the background noise;
- identifying momentary interference in the background noise;
- identifying continuous interference in the background noise;
- identifying varying interference in the background noise;
- identifying stationary interference in the background noise;
- identifying spatial locations of sources of the background noise;
- identifying potential sources of the background noise; and
- identifying speech in the background noise.

7. The method of claim 1 further including the steps of:

receiving the real-time data;

identifying relevant characteristics of the speech based on the real-time data, the relevant characteristics having corresponding run-time control parameters; and

applying adjustment values to parameter values of the control parameters such that the relevant characteristics of the speech change in a desired fashion.

8. The method of claim 7 further including the step of changing relevant speaker characteristics of the speech.

9. The method of claim 8 further including the step of changing relevant voice characteristics of the speech.

10. The method of claim 9 further including the step of changing characteristics selected from the group consisting essentially of:

speech rate;
pitch;
volume;
parametric equalization;
formant frequencies and bandwidths;
glottal sources;
speech power spectrum tilt;
gender;
age; and
identity.

11. The method of claim 8 further including the step of changing relevant speaking style characteristics of the speech.

12. The method of claim 11 further including the step of changing characteristics selected from the group consisting essentially of:

dynamic prosody; and
articulation.

13. The method of claim 7 further including the step of changing relevant emotion characteristics of the speech.

14. The method of claim 13 further including the step of changing an urgency characteristic of the speech.

15. The method of claim 7 further including the step of changing relevant dialect characteristics of the speech.

16. The method of claim 15 further including the step of changing characteristics selected from the group consisting essentially of:

pronunciation; and
articulation.

17. The method of claim 7 further including the step of changing relevant content characteristics of the speech.

18. The method of claim 17 further including the step of changing characteristics selected from the group consisting essentially of:

repetition;

redundancy; and

vocabulary.

19. The method of claim 1 further including the step of using polyphonic audio processing to spatially reposition the speech based on the real-time data.

20. The method of claim 1 further including step of generating the real-time data based on listener input.

21. The method of claim 1 further including the step of using the synthesized speech in an automotive application.

22. A method for modifying one or more speech synthesizer run-time control parameters, the method comprising the steps of:

receiving real-time data;

identifying relevant characteristics of synthesized speech based on the real-time data, the relevant characteristics having corresponding run-time control parameters; and

applying adjustment values to parameter values of the control parameters such that the relevant characteristics of the speech change in a desired fashion.

23. The method of claim 22 further including the step of changing relevant speaker characteristics of the speech.

24. The method of claim 23 further including the step of changing relevant voice characteristics of the speech.

25. The method of claim 23 further including the step of changing relevant speaking style characteristics of the speech.

26. The method of claim 22 further including the step of changing relevant emotion characteristics of the speech.

27. The method of claim 22 further including the step of changing relevant dialect characteristics of the speech.

28. The method of claim 22 further including the step of changing relevant content characteristics of the speech.

29. A speech synthesizer adaptation system comprising:

a text-to-speech synthesizer for generating speech based on textual input and a plurality of run-time control parameter values;

an audio input system for generating real-time data based on background noise contained in an environment in which the speech is reproduced; and

an adaptation controller operatively coupled to the synthesizer and the audio input system, the adaptation controller modifying one or more of the run-time control parameter values based on the real-time data such that interference between the background noise and the speech is reduced.

30. The adaptation system of claim 29 wherein the audio input system includes an acoustic-to-electric signal converter.